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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,228	09/24/2003	Shubneesh Batra	MI22-2397	8207

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EXAMINER

LEE, HSIEN MING

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/671,228	Applicant(s) BATRA ET AL.	
	Examiner Hsien-Ming Lee	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 50-76 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 61-76 is/are allowed.
- 6) ☒ Claim(s) 50-59 is/are rejected.
- 7) ☒ Claim(s) 60 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Remarks

1. Applicant's cancellation to claims 1-49 is acknowledged. Claims 50-76 are newly added.

Specification

2. The disclosure is objected to because of the following informalities: missing cross reference data because the instant invention is a continuation of 09/808,705 (US 6,627,492) and 09/320,404 (US 6,204,149). Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 50-57 are rejected under 35 U.S.C. 102(e) as being anticipated by Yao et al. (US 6,048,775).

In re claim 50, Yao et al., in Figs. 1-5 and related text, teach the claimed method of forming a polished material, comprising:

- providing a substrate 10/14/16;
- forming spaced trenches 20 and 22 into the substrate 10/14/16, the substrate 10/14/16 having an upper surface extending between the trenches 20 and 22;
- forming a material within the trenches, the material comprising a lower layer 24 (i.e. HDP-CVD oxide) and an upper layer 40 (i.e. silicon nitride) over the lower layer 24,

the lower layer 24 substantially filling the trenches 20 and 22 and having a different polishing rate than the upper layer 40, the lower layer 24 joining the upper layer 40 at an interface, the interface comprising first portions directly over the trenches 20 and 22 and second portions directly over the upper surface of the substrate 10/14/16, the first portions being substantially coplanar (Fig.4); and

- polishing the material down to an elevational level of at least one of the first and second portions of the interface (Fig.5).

In re claims 51-52, Yao et al. teach that the polishing comprises polishing the material to about an elevational level of the first portions of the interface and polishing the material to the second portions of the interface (Fig.5).

In re claims 53-55, Yao et al. also teach that the first portions of the interface (i.e. the portions directly over the trenches 20 and 22) comprise an elevational plane below the second portions of the interface (i.e. the portions directly over the upper surface of the substrate) (Fig.4); and the second portions of the interface are shaped as peaks extending above the first portions of the interface (Fig.4).

In re claims 56-57, Yao et al. also teach that the upper layer of the material 40 comprises an uppermost surface, and the uppermost surface is shaped as peaks over the second portions the interface and substantially planar over the first portions of the interface (Fig.4).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 50-53 and 58-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. (US 5,728,621) in view of Yao et al. (US '775).

In re claim 50, Zheng et al., in Figs. 1-6 and related text, teach the claimed method of forming a polished material, comprising:

- providing a substrate 10/12/14;
- forming spaced trenches 16 into the substrate 10/12/14, the substrate 10/12/14 having an upper surface extending between the trenches 16 (Fig.2);
- forming a material within the trenches 16, the material comprising a lower layer 18 (i.e. HDP-CVD oxide) and an upper layer 20 (i.e. SOG) over the lower layer 18, the lower layer 18 substantially filling the trenches 16 and having a different polishing rate than the upper layer 20, the lower layer 18 joining the upper layer 20 at an interface, the interface comprising first portions directly over the trenches 16 and second portions directly over the upper surface of the substrate 10/12/14, (Fig.4); and
- polishing the material down to an elevational level of at least one of the first and second portions of the interface (Figs.5-6).

Zheng et al. do not expressly teach that the first portions (i.e. the portions directly over the trenches 16 or area A) are substantially coplanar.

However, Yao et al., in an analogous art, teach filling trenches 20/22 with a lower layer 24 and an upper layer 40, wherein the lower layer has a same material (i.e. HDP-CVD oxide) as that of Zheng et al. and the portions of the lower layer 24 directly over the trenches 20/22 is substantially coplanar (Fig. 4).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time the invention was made, to modify the method of Zheng et al. in a manner as taught by Yao et al. so that the lower layer that substantially fills the trenches would be substantially coplanar, since by this manner it would benefit the subsequent planarization.

In re claims 51-53, Zheng et al. also teach that the polishing comprises polishing the material to about an elevational level of the first portions of the interface and polishing the material to the second portions of the interface; and the first portions of the interface (i.e. the portions directly over the trenches 16 or area A) comprise an elevational plane below the second portions of the interface (i.e. the portions directly over the upper surface of the substrate or area B) (Figs. 5-6).

In re claim 58, Zhang et al. also teach polishing the material to an elevational level below the first portions of the interface because it polishes down below an initial top surface of layer 14 (i.e. from Fig.5 to Fig.6).

In re claim 59, Zhang et al. also teach polishing the first layer 18 of the material at the second portions of the interface before the first portions of the interface because the uppermost of the second portions (i.e. a plateau at area B in Fig.4) will be polished first prior to polishing area A.

Allowable Subject Matter

7. Claim 60 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 61-76 are allowed.

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9. The following is a statement of reasons for the indication of allowable subject matter:

In re claim 60, the prior art of record neither teaches nor suggests that the polishing occurs at a *faster* rate at the *second* portions of the interface than the polishing at the *first* portions of the interface.

In re claim 61, the prior art of record neither teaches nor suggests the material comprising a lower layer, which polishes at a first rate, and comprising an upper layer, which polishes at a second rate, which is *faster* than the first rate. In fact, both Yao et al. and Zhang et al. teach the opposite, i.e. the upper layer has a slower polishing rate.

In re claim 67, the prior art of record neither teaches nor suggests *modifying the first temperature parameter* of the set to a *second temperature parameter* to form a *second layer of the material* over the first layer and substrate, the first layer having a wet etch rate *less than* a wet etch rate of the second layer.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-Ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on M-F (9:00 ~ 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hsien-Ming Lee
Examiner
Art Unit 2823

March 31, 2004

